LOK SABHA SECRETARIAT
Research and Information Division

INFORMATION BULLETIN

No. LARRDIS (SAW) 2012/IB-1 DECEMBER 2012

WATER CONSERVATION AND MANAGEMENT IN INDIA

INTRODUCTION

Water is a limited natural resource. It is a pre-requisite for life, livelihood, food security and sustainable development, and as such, is most essential for the very survival of all living beings. With global climate change severely altering the weather patterns and impacting the way we live on earth, water-related issues have assumed very serious proportions in recent years. Galloping population growth and the concomitant pressure on the natural resources have underlined the necessity to have a relook at the position of fresh water availability in the world. The challenge is more serious than it is generally understood as the availability of water is at the root of the sustenance of human race and civilization. Great civilizations settled and flourished around water sources and societies evolved their entire cultures and livelihoods based on it. Presently, more than 26 countries are considered water-scarce, with the projection that by the year 2025, 2/3rd of the global population is likely to live in countries with moderate or severe shortage of water. In India, the water crisis has now become a reality with *per capita* availability declining from 5,150 cubic metres in 1947 to 1,545 cubic metres in 2011 and is expected to be around 1,100 cubic metres by 2050. In most parts of the country, the crisis is quite severe and effective measures for conservation and stoppage of water wastage are yet to be developed by us.

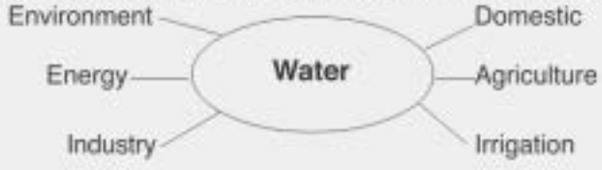
Historically, many a conflict had its origins in the scarcity of resources. It is said that the "future wars will be fought not over oil, but over water". Today, everyone concerned recognizes that the solution lies in properly conserving the available resources and in increasing their availability to the needy. There is an urgent need to look into the supply and demand management aspects for developing an effective strategy and to provide for concrete solutions to the challenges associated with it. These include adoption of techniques for improved water availability such as water conservation and pollution prevention, improving water use efficiency, recycling and reuse of drainage water, etc. These actions are required to be taken both within and among the basin nations to avert any crisis.

WATER CONSERVATION: CONCEPT AND MEANING

Water conservation refers to reducing the usage of water and recycling of waste water for different purposes such as cleaning, manufacturing and irrigation. Water conservation can be defined in various ways — effecting tangible reduction in water loss, use or waste as well as the preservation of water quality; a reduction in water use accomplished by implementation of water conservation or water efficiency measures; or, improved water management practices that reduce or enhance the beneficial use of water. A water conservation measure is, thus, an action, behavioural change, device, technology, or improved design or process, implemented to reduce water loss, waste, or use. Further, there is an underlying need for having water efficiency, which is nothing but a tool of water conservation that results in more efficient water use, and thus reduces water demand. The value and cost-effectiveness of a water efficiency measure must be evaluated in relation to its effects on the use and cost of other natural resources, e.g. energy or chemicals.

GOALS AND RATIONALE

Water is a precious natural resource which not only caters to the domestic consumption of our people, it is also required for variety of other uses today. The following diagram shows the pre-eminent position of water in an industrialized world and also the close relationship between the various dimensions of our environment:



India has 4% of water resources of the world to support nearly 18% of the world population and 15% of the global livestock[1]. With its monsoon dominated climate, spatial and temporal inequities in rainfall, having to address the demand for water from irrigation, industries and huge population, India is faced with numerous challenges like availability of water, optimal management, a better distribution mechanism, reduction of high rates of leakages, retrieving waste water and harvesting rainwater. These are plaguing the country with an accelerating mismatch between demand and supply leaving us severely water-stressed. This should compel us to think over the issue of conserving water in a holistic manner. The specific goals of water conservation efforts may be put as follows:

Sustainability: Ensuring availability of water for future generations and also the withdrawal of fresh water from an ecosystem not exceeding its natural replacement rate.

Energy conservation: As water pumping, delivery, and waste water treatment facilities consume a significant amount of energy, the need for energy conservation is essential as part of the measures for water management.

Habitat conservation: By minimizing the human use of water, we can help preserve fresh water habitats for local wildlife as well as for reducing the need to build new dams and other water diversion infrastructures.

One of the strategies towards conservation could be universal metering. The prevalence of residential water metering varies significantly worldwide. In addition to raising consumer awareness of their water use, metering is recognized as an important means to identify and localize water leakage. Some researchers have suggested that water conservation efforts should be primarily directed at farmers, in the light of the fact that crop irrigation accounts for 70% of the world's fresh water use. The agricultural sector is important both economically and politically, and water subsidies are common in most countries. Therefore, the advocates of conservation have urged removal of all subsidies to force farmers to grow more water-efficient crops and to adopt less wasteful irrigation techniques. However, many view such approaches as too harsh and counter-productive for the developing economies.

MAJOR APPLICATIONS

(a) Household applications

Wide-ranging water-saving technologies are presently available for household applications—energy-efficient shower heads, low-flush toilets and composting toilets, use of saline water/sea water/rain water for flushing toilets, high-efficiency clothes washers, weather-based irrigation controllers, use of low-flow taps in wash basins, use of waste water for growing of plants, waste water reuse or recycling systems, rainwater harvesting, etc.

(b) Commercial applications

The water-saving devices used for low-flush toilets in homes can also be equally useful in commercial establishments such as—waterless urinals, waterless car washes, pressurized water-brooms, cooling tower conductivity controllers, water-saving steam sterilizers for use in hospitals and health-care facilities, etc.

(c) Agricultural applications

For crop irrigation, there is a need for optimal water efficiency which can be achieved by minimizing losses due to evaporation, run-off or sub-surface drainage while maximizing production. An evaporation pan in combination with specific crop correction factors can be used to determine how much water is needed to satisfy plant requirements. Some of the common practices used for crop irrigation system include flood irrigation, overhead irrigation, drip irrigation, etc. However, the changing irrigation systems have started becoming quite expensive necessitating conservation efforts to be more serious in maximizing the efficiency of the existing system—chiseling compacted soils, creating furrow dikes to prevent run-off, and using soil moisture and rainfall sensors to optimize irrigation schedules. Usually, large gains in efficiency are possible through measurement and more effective management of the existing irrigation system.

MINIMUM WATER NETWORK TARGET AND DESIGN

The cost effective minimum water network is a holistic framework/guide for water conservation that helps in determining the minimum amount of fresh water and waste water target for an industrial or urban system by using all conceivable methods to save water. The technique ensures that the designer desired payback period is satisfied using Systematic Hierarchical Approach for Resilient Process Screening (SHARPS) technique. SHARPS is a cost-screening technique to assist designers achieve a desired investment payback period during preliminary design of water-using systems. Heuristics involving equipment substitution and intensification are used to guide process changes. SHARPS method has been used to yield cost-effective minimum water network for water-intensive facilities.

THE INDIAN SCENARIO

Water demand could go up considerably across the world in the coming two decades and the crisis is expected to get worse. According to a study by the *Water Resources Group*[2], the demand for water in India will double by the year 2030,

[1] Annual Report, 2010-11 of the "Ministry of Water Resources", Government of India, New Delhi, p. 1

[2] '*Charting our Water Future: Economic Frameworks to Inform Decision-making*', Water Resources Group Limited, Sydney, Australia, p. 9, published by The World Bank in 2009.

from 700 billion cubic metres to 1,498 billion cubic metres. The biggest deficits will be in the most populous river basins—Ganga, Krishna and Indus. The demand could nearly be double of China's projected 818 billion cubic metres. As per 2011 population census, India's *per capita* availability of water has been pegged at 1,545 cubic metre a year, including non-personal consumption such as irrigation, which is notches below the international threshold of 1,700 cubic metre a year[3]. The National Commission for Integrated Water Resources Development had in its Report (1999) assessed that the water requirement in the country by the year 2025 and 2050 will be about 843 billion cubic metres and 1,180 billion cubic metres respectively. One-fifth of Indian households and around 3.8 crore women travel more than half-a-kilometer for fetching drinking water. Rapid depletion of ground water level in the country is compounding the drinking water woes, with wells in many areas going dry during the summer season.

The majority of our water requirement, around 80 per cent, is in the agriculture sector as farmers plant more rice, wheat and sugar to feed the country's growing population. The shortfall can be prevented, the report pointed out, by adopting basic conservation measures, especially in the agricultural sector. Drip irrigation, where a pipe delivers water directly to plant roots rather than over the field, and no-till farming could conserve water to meet the future demand. Many experts are of the view that if our traditional and time-tested conservation techniques are effectively used, around 40 per cent wastage could be averted.

The *Water Resources Group* study estimates that it would cost around $ 6 billion (Rs. 27,000 crore) to implement enough water conservation strategies to meet the projected demand. But since agricultural income could increase to $ 83 billion (Rs. 385,950 crore) by 2030, water management and wastage control could still be given the importance it deserves. With India fast turning into a 'water scarce' nation, we can't afford to be complacent on the water front, especially in respect of the planning on the issue of water resources management.

It is in this context that the reported decision of the Government to provide Rs. 4,000 crore for the *Repair, Renovation & Restoration (RRR) Scheme,* a joint Centre-State project to restore and/or increase the capacities of lakes and ponds and freshen their water, assumes significance. It is expected to reduce the water shortage and the various types of illness caused by the use of dirty and contaminated water.

The first-ever census of the country's water bodies, assessed to be more than 13 lakh of which about one lakh has been chosen for restoration in the first phase, is already initiated. Although the census cover every water body, only public ones will be restored and this task is to be undertaken by the *panchayats* and the *municipalities*. The restoration job will primarily include de-silting, repair of the conveyance system (through which the water is replenished), strengthening of banks, prevention of soil erosion and the like.

It is a well-known fact that community water bodies are significant to the preservation of ecology and the well-being of the users. Effective cleaning of these bodies and their preservation, maintaining their hygienic content, can be achieved only with the full participation of the people and the organizations at different levels in this campaign. This would also ensure that water-borne, water-based and water-related diseases are brought down in the community as clean water is a sure and tested pre-requisite for good health.

NATIONAL WATER POLICY

The National Water Policy adopted by the National Water Resources Council in 2002 lays emphasis on the regulation of exploitation of ground water resources for not exceeding the recharging possibilities and also highlights the need for effective prevention of detrimental environmental consequences of over-exploitation of ground water. The policy further stresses that over-exploitation of ground water should be avoided, especially near the coastal areas so as to prevent ingress of seawater into sweet water acquifers. Accordingly, assessment of replenishable ground water resources was carried out jointly by the Central Ground Water Board and the State Ground Water Organizations till the year 2004 and a total of 839 assessment units at the *block/taluka/mandal* levels were found to be over-exploited. For ensuring optimal over-exploitation of ground water resources, the Ministry of Water Resources circulated to the States/Union Territories the Model Bill to regulate and control the development and management of ground water. The Ministry of Water Resources, after extensive consultation with all stakeholders, have evolved a draft National Water Policy (2012). Some of the important points in the New Draft National Water Policy[4] are as follows:

1. There is a felt need to evolve a broad overarching national legal framework of general principles on water.
2. The Centre, the States and the local bodies must ensure access to a minimum quantity of potable water for essential health and hygiene to all its citizens, available within easy reach of the household.
3. Community based water management should be institutionalized and strengthened.
4. Special impetus should be given towards mitigation at micro level by enhancing the capabilities of the community to adopt climate-resilient technology option like increasing water storage in its various forms, namely soil moisture, ponds, ground water, small and large reservoirs.
5. Stakeholder participation in land-soil water management with scientific inputs from local research and academic institutions for evolving different agricultural strategies, reducing soil erosion and improving soil fertility should be promoted.
6. The availability of water resources in the country needs to be assessed scientifically and reviewed at periodic intervals, say every five years.

[3] The Hindustan Times, New Delhi, 9 December 2011.

[4] Revised Draft National Water Policy, 2012, Ministry of Water Resources, Government of India, New Delhi.

7. There is a need to map the aquifers to know the quantum and quality of ground water resources.
8. Declining ground water level in over-exploited areas needs to be arrested by introducing improved technologies of water use, incentivizing efficient water use and encouraging community-based management of aquifers.
9. Inter-basin transfers of flood waters to recharge depleting ground waters in water-stressed areas should be encouraged.
10. Watershed development activities need to be taken in a comprehensive manner to increase soil moisture, reduce sediment yield and increase overall land and water productivity.
11. Priority to be given to bring in maximum efficiency in the use of water and for avoiding wastages.
12. A system to evolve benchmarks for water users for different purposes i.e. 'water footprint' and 'water auditing' should be developed to promote and incentivize efficient use of water.
13. Water needs to be treated as an economic good, and therefore, may be priced to promote efficient use and maximizing value from water. While the practice of administered prices may have to be continued, economic principles need to increasingly guide the administered prices.
14. Sources of water and water bodies should not be allowed to get polluted. System of third party periodic inspection should be evolved and heavy penalty should be imposed on the basis of 'polluter pays principle'.
15. Water resources projects should be planned considering social environmental aspects also, in addition to techno-economic consideration in consultation with project-affected and beneficiary families.
16. While every effort should be made to avert water-related disasters like floods and droughts, through structural and non-structural measures, emphasis should be on preparedness for flood/drought with coping mechanisms as options.
17. There is a need to remove the large disparity between stipulations for water supply in urban areas and in rural areas.
18. In urban and industrial areas, desalination, wherever it is techno-economically feasible, should be encouraged to increase availability of utilizable water.
19. A Water Regulatory Authority should be established in each State.
20. There should be a forum at the national level to deliberate upon issues relating to water and evolve consensus, cooperation and reconciliation amongst party States.
21. A permanent Water Dispute Tribunal at the Centre should be established to resolve the disputes expeditiously in as equitable manner as possible.
22. Efforts should be made to enter into international agreement with neighbouring countries on bilateral basis for exchange of hydrological data of international rivers on near real-time basis.
23. All hydrological data, other than those classified as secret on national security consideration, should be in the public domain.
24. Continuing research and advancement in technology shall be promoted to address the issue in the water sector in a scientific manner.

NATIONAL WATER MISSION

The National Water Mission is one of the eight National Missions which form the core of the National Action Plan for climate change. The Mission Document for the National Water Mission was drafted by the Ministry of Water Resources in consultation with the State Governments, concerned Central Ministries, Non Governmental Organizations, academicians and other stake holders. It was approved on 6th April, 2011 by the Union Cabinet. The objective of the National Water Mission is "conservation of water, minimizing wastage and ensuring its equitable distribution both across and within States through integrated water resources development and management". It envisages the following five goals:

1. Comprehensive water data based in public domain and assessment of the impact of climate change on water resource.
2. Promotion of citizen and State actions for water conservation, augmentation and preservation.
3. Focused attention to vulnerable areas including over exploited areas.
4. Increasing water use efficiency by 20%.
5. Promotion of basin level integrated water resource management.

INSTITUTIONAL INITIATIVES

(a) Governmental

Water being an important natural resource for the sustenance of the mankind, the Government has recognized that it is important to evolve effective methods for its conservation and to ensure adequate supply of drinking water to all our people. Given its vitality for the masses, the Central Water Commission (CWC) has been monitoring the storage position

of reservoirs of our country. The extent to which irrigation and hydro-power sectors utilize water from these reservoirs depends on rainfall and varies from year to year. In early July 2012, the storage in our reservoirs is only about 57 per cent of the storage during the corresponding period last year. This depletion in the water levels in the major reservoirs is owing to the delayed and weak south-west monsoon, which has prompted the Central Government to issue an advisory to the States to make "judicious and regulated" releases of water from the reservoirs[5]. This is against the live storage capacity of 154.421 billion cubic metres (BCM), the average storage till July 5 being only 25.191 BCM in the 84 major reservoirs monitored by the Central Water Commission. Given the seriousness of the problem, the States have been advised to give preference to drinking water and irrigation and enhance ground water use to meet current needs.

Ground water being a major source, its management has been particularly focused upon by the institutions mandated to deal with it. The Planning Commission has constituted an Expert Group on "Ground Water Management and Ownership" in the year 2005 to take stock of the ground water situation and for identifying reasons for fall in the ground water levels in certain parts of the country and for suggesting measures to tackle the ground water management problems. The Committee in its report has observed that while huge electricity subsidy may have contributed to depletion of ground water, a cut in subsidies could have only marginal positive impact on extraction. The report further states that a long-term strategy that links the extent of subsidy with the reliability and duration of power supply can have positive results for both ground water management and the viability of the power sector. During the XI Plan, demonstrative projects on rain water harvesting and artificial recharge have been implemented by the Central Ground Water Board under the Central sector scheme of Ground Water Management and Regulation in priority areas *viz.,* over-exploited and critical areas, urban areas and the areas affected by water quality problems for replication by the State Governments under similar hydro-geological environments. A 'Model Bill' which, *inter alia*, provides for making roof-top rain water harvesting mandatory, has been circulated to enable States/Union Territories to enact suitable legislation for regulation and control of ground water development. So far, 11 States/Union Territories, namely, Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Kerala, Tamil Nadu, West Bengal, Chandigarh, Dadra & Nagar Haveli, Lakshadweep and Puducherry have enacted legislations to deal with ground water issues.

Drinking water supply is one of the six components of *Bharat Nirman*, a flagship programme of the Government of India, which was conceived as a plan to be implemented in four years, from 2005-06 to 2008-09 for building rural infrastructure. Irrational and unsustainable water withdrawals from ground water tanks and reservoirs for agriculture and industrial purposes are increasing at an alarming rate, which, in turn, has created acute drinking water scarcity for the people, besides causing 'ground water depletion' in many States. This has contributed towards aggravating water quality problems associated with excess fluoride, arsenic and brackishness in certain areas. This gets manifested in the form of various diseases like fluorosis and arsenical dermatitis. The Human Development Report, 2006 had called for a Global Action Plan under G-8 leadership to resolve the growing water and sanitation crisis that causes nearly 2 million child deaths every year.

Drinking water supply and sanitation are the subjects of State Governments. These are included in the Eleventh Schedule of the Constitution of India as among the subjects entrusted to the *Panchayats/Municipalities* by the States. Hence, the State Governments should be given enough say in protecting, developing and managing this resource in the best possible way, aided by technically sound and socio-economically harmonious methods and processes. Since the *First Five Year Plan*, both the Government of India and the State Governments have substantially invested in water supply sector for providing potable water to the people. It is perceived by many that by harvesting flood water and wasted rain water, India could easily tide over its water crisis.

(b) Parliamentary

The Members of Parliament attach a great deal of importance to the conservation and efficient utilization of water. Taking into consideration the gravity of the problem and the need for meaningful inputs in policy formulation from our elected representatives, under the direction of the then Hon'ble Speaker, Lok Sabha, Shri Somnath Chatterjee, the Parliamentary Forum on Water Conservation and Management was formally launched on 12 August 2005. Later, during the Fifteenth Lok Sabha, Hon'ble Speaker, Lok Sabha, Smt. Meira Kumar, in consultation with the Hon'ble Chairman, Rajya Sabha, re-constituted the Forum on 21 January 2010, with Shri Prabodh Panda, MP (Lok Sabha) as Member-Convener. Its mandate extends primarily to identifying problems relating to water and to make suggestions/recommendations for consideration and appropriate action by the Government and the organizations concerned, besides to ascertain ways of involving Members of Parliament in the issues of conservation and augmentation of water resources in their constituencies and the State they belong to. The elected representatives of the people can contribute substantially towards educating their constituents of the importance of water conservation and management and also in mobilizing them to make use of appropriate techniques in their efforts.

In order to make the working of this Forum effective, the Ministry of Water Resources has been rendering necessary assistance to it in all matters. Representatives from the Ministries of Water Resources, Urban Development, Rural Development, Agriculture, Science and Technology and Drinking Water and Sanitation attend the meetings/seminars of the Forum. Besides, the Forum is also appraised periodically by the Government of the impact of implementation of the suggestions/recommendations of the Forum regarding water conservation and management. The Forum has organized 16 Meetings during the Fourteenth Lok Sabha and 9 Meetings have been held so far during the Fifteenth Lok Sabha.

[5] The Hindu, New Delhi, 10 July 2012.

With a view to making the water conservation plans a reality, the Parliament House Complex has put in place its own conservation system with all the three major buildings inside the Complex having benefited from the system of rain water harvesting.

RAIN WATER HARVESTING AND GROUND WATER CONSERVATION

Rain water harvesting is defined as the accumulation and storage of rain water before it reaches the aquifer for use at a later stage. In simpler terms, it means catching and holding of rain where it falls and then using it.

This is an age-old practice by harvesting rain water in a natural way. It is simple to install and operate, operational costs are negligible, and water is provided at the point of consumption. Its use is manifold and ranges from providing drinking water, water for livestock, water for irrigation to recharging of the ground water. Rain water harvesting plays an important role, especially in urban areas, by ensuring an independent water supply mechanism where maintaining an adequate water supply has always been a matter of concern. In India, rain water harvesting was first introduced in Andhra Pradesh, and subsequently, became popular in States like Kerala, Rajasthan, Tamil Nadu, and many other States.

India is the largest user of ground water in the world. Almost a third of ground water aquifers are semi-critical, critical and over-exploited and some estimates suggest that at current rate of extraction, three-fifth of the ground water blocks could turn critical by 2025. About 60% of irrigation requirements and over 80% of our rural and urban water supply are being met from ground water now.

Given the fact that ground water is a national resource, and hence, a public property, its over-exploitation for private purposes, especially for commercial gains, may have to be regulated. In the same way that all other natural resources are extracted from the ground, like oil, gas and other minerals on account of their being a national resource, tapping of the water resource for use in infrastructure building and other commercial and industrial concerns can be regulated by the Government.

Therefore, a proposal is being mooted by the Union Government to have a law that will ensure better regulation of ground water by the Government as a public trustee with the involvement of communities in the management of underground aquifers. That would overhaul the management of ground water in India by giving community rights over aquifers instead of restricting these to landowners who can simply drill and exploit the resource.

Since 'water' is a 'State subject', the proposal is to pass a framework law to make it in conformity with the ground water management rules. The proposed law is intended to be also in compliance with the Supreme Court rulings, including the Public Trust Doctrine, which could end the 'common law doctrine' that has regulated ground water use in India since the colonial era. This would go a long way in managing the problem of unchecked exploitation of ground water resource in our country by ending the landowners' complete rights to draw as much water as they want without a liability or responsibility towards others.

Considering the gravity of the water problem in our country and the vital role of groundwater in solving this problem, the Ministry of Water Resources (MoWR) has started various promotional schemes by instituting annual awards, namely, the Ground Water Augmentation Awards (*Bhoomijal Samvardhan Puraskar*) and National Water Award, in the Year 2007, with the specific objective of encouraging NGOs/Gram Panchayats/Urban Local Bodies/Institutions/ Corporate Sector and individuals. For popularizing the concept of artificial recharge among the stakeholders as well as the water managers, the Government of India has constituted an Advisory Council on Artificial Recharge to Ground Water in the year 2006 under the Chairmanship of the Minister of Water Resources. Since its constitution, the Council has held four meetings and has made several recommendations upon which the MoWR has taken the following actions[6]:

(i) The year 2007 was declared as the "Water Year".

(ii) Report on "Ground Water Quality in Shallow Aquifers of India" was compiled and released.

(iii) Report on "More crop and income per drop of water" was prepared.

(iv) The Web-enabled Ground Water Information System (GWIS) was brought to the public domain in March 2010 by allowing access to the last five years' water level and water quality data of National Hydrograph Stations of Central Ground Water Board (CGWB).

(v) Ground water monitoring with Participatory approach involving PRI/Locals was initiated.

(vi) Implementation of Farmers Participatory Action Research Programme (FPARP) was made in 25 States/UTs of the country.

WATER CONSERVATION DAY

The Union Ministry of Water Resources organized a function on 19th November 2012 to mark the birth anniversary of 1st Woman Prime Minister Late Smt. Indira Gandhi as 'Water Conservation Day'. It was intended to create awareness regarding concern about limited water resources and growing demand for domestic, industrial and agricultural uses.

[6] From the website of Ministry of Water Resources, Government of India, New Delhi.

INTERLINKING OF RIVERS AND THE SUPREME COURT JUDGEMENT ON THE ISSUE

The genesis of the proposed Interlinking of Rivers (ILR) Plan goes back to the British period when the plans of British engineer Sir Arthur Cotton sought to link the Ganga and the Cauvery rivers. At that time, the idea was to improve connectivity for navigation purposes, but with the expansion of the rail roads, the idea was shelved. The idea of inter-basin transfers, viz. from surplus to deficit regions, has been mooted off and on over the past century. But it was not until 1980 that the project gathered steam, when the Ministry of Irrigation formulated a national perspective plan for optimum utilization of the country's water resources. In 1982, the National Water Development Agency (NWDA) was formed as an autonomous body entrusted with the task to carry out the water balance and feasibility studies of the river linking programme. The work was divided into two components: Peninsular and Himalayan river development, with 16 and 14 link schemes respectively. The apex court of India has now given the go ahead for the controversial inter-linking river project, seeking to transfer water from surplus to water-deficit areas in the country. In its final judgement dated 27 February, 2012, a three-member bench, headed by the Chief Justice of India, expressed the 'hope of speedy implementation' to bring the project to a success. The project, formally in the pipeline since 1980, has been touted by its advocates as the solution to a number of problems: making water available for irrigating 35 million hectares; enabling full use of existing irrigation projects; generating power to the tune of 34,000 MW with added benefits, including flood control.

It has been repeatedly emphasized in the court over the past decade that the cost is negligible when compared to the potential benefits. But this seems to be quite difficult considering there is no true estimate of the project cost. Earlier this year, the apex court had said that it would not favour interlinking of rivers if it were to involve huge financial burden on the Centre. A decade ago the cost of the project was estimated at 5,60,000 crore; the true cost can be known only when the detailed project reports of the 30 river link projects are drawn up.

The court's latest and final judgment on the matter mandates the formation of a committee to "take firm steps and fix a definite time line to lay down the guidelines for the completion of feasibility reports or other reports" and "ensure the completion of projects so that the benefits accrue within reasonable time and cost". The committee, with representation from various Government departments, and nominated civil society representatives, is required to meet at least once in two months. All existing reports are to be placed before the committee, which is ordered to take note of the suggestions in the reports and to take decisions as to how the same are to be implemented. The committee is mandated to submit a bi-annual report to the Cabinet, placing before it the status and progress reports[7]. The Cabinet is expected to expedite the matter within thirty days from the date the matters are first placed before it for consideration.

However, the apex court has also stated that "a greater element of mutuality and consensus needs to be built between the States and the Centre on the one hand, and the States *inter-se* on the other", on this issue.

CONSERVATION AND MANAGEMENT ISSUES INVOLVING RIVER GANGA

Historically, the river Ganga has been of high religious and cultural significance for India. An estimated 2,000,000 people ritually bathe daily in the river, which is considered holy by a large section of our people. Taking into account its religious, socio-cultural and commercial significance, with an objective of reducing the pollution load on the river, the Central Government undertook a project, the Ganga Action Plan (GAP), in April 1985, during the Prime Ministership of late Shri Rajiv Gandhi. The Plan envisaged to create sewage treatment plants in the cities along the Ganges so that no untreated sewage is discharged into the river. This was expected to bring the quality of the river water to a desired level, according to the Planning Commission of India. The Plan was later renamed the National River Conservation Plan (NRCP) in the year 1995, and was broad-based to tackle pollution levels in other identified polluted stretches of major rivers, for improving their water quality to the bathing quality standards. The Steering Committee of the National River Conservation Authority (NRCA) reviewed the progress of the GAP and necessary corrections were made on the basis of lessons learned and experiences gained from the GAP phase. Subsequently, GAP-II was approved in April 1993 for pollution abatement of remaining works on river Ganges with 3 other rivers — Yamuna, Damodar and Gomti. The NRCP was later extended to other major rivers of the country in 1995. In December 1996, GAP-II was merged with NRCP. River Mahananda was included in the year 2005-06. At present, NRCP covers 35 stretches of polluted rivers in 164 towns spread across 20 States. GAP-I, which was launched in June 1985, was subsequently declared closed on 31st March, 2000. Action Plans for different rivers were being drawn up on the basis of surveys by the Central Pollution Control Board (CPCB) and the State Pollution Control Boards (SPCB). Despite the best efforts of the Government in implementing the Phase-I and II of the GAP, it has not been able to free the water of this river from all sorts of pollutants. The civil society groups have, thus, been trying to supplement the efforts of the Government to not only rid the polluting elements of the Ganges, but also in maintaining the right ecological balance in and around the banks of this river, especially near its source.

THE ROAD MAP AHEAD

There is a need to give river basin approach of water conservation a serious thought in amalgamating it into the mainstream water conservation methods. The strength of the river basin approach stems from its flexibility to deal with changing situations. The approach includes integrating water projects throughout the basin to fulfil as many different

[7] The Hindu, New Delhi, 27 February 2012.

needs as possible; constructing efficient multi-purpose water storage structures to provide irrigation, navigation, flood control, recreation opportunities, power generation as well as consistent water supply and using water resources management to direct regional development, thereby maximizing economic and social returns.

There is a growing need for the farmers to turn to new rice growing techniques to reduce water usage. The change would not only help save water, but also energy and overall production cost. The Philippines based International Rice Research Institute has been experimenting the "Alternative Wetting and Drying" technique which reduces water use in a rice field by 10-30%. In Bangladesh 50,000 technical trial results showed the 'Alternative Wetting and Drying' technique reduced water consumption by 30-50% and the cost of irrigation by 21-27%.

Community based water management with a vision of treating water as a common property to be managed locally by the community for sustainable development and equitable distribution of water should be encouraged. It should encompass the missions of community empowerment of water management, protection as well as nurture of water bodies at grassroots and building the capacity of community, using the strategies like networking amongst communities, public agencies, water professionals; strengthening Public-Public partnership; formation of core community based water management team and capacity building. Empowerment of water user associations and revival of participatory approach is sought out to be the major solution in the operation and maintenance of water resources.

Micro irrigation at the grass root levels should be encouraged. In micro irrigation conveyance loss is minimal. Evaporation, run off and deep percolation are reduced as compared to other traditional irrigation systems. Besides, a smaller power unit is required, easing out the pressure on power consumption. Weed growth is inhibited and disease incidences reduced due to limited wetted area, thus aiding not only conservation, but also maximizing the economic returns for the resource users.

An effective institutional framework to regulate water resources within the State is required to facilitate and ensure judicious, equitable, sustainable management, allocation and utilization of water resources, given the fact that water is a finite resource and that it is essential to sustain life, attain development and preserve environment. Water as a resource thus needs to be brought under a regulatory framework to deal with all the issues confronting it in a holistic way.

CONCLUSION

Effective water management is very essential for the growth and development of any country. For a country as populous as India, endowed as it is with a wide network of rivers, lakes and other traditional water sources, it is imperative to devise adequate mechanism to regulate the distribution of their water, and to protect them from being polluted due to rapid urbanization and industrialization, as seen in recent times. Unless water problem is adequately addressed with sufficient planning and care, life on earth itself could be threatened in the years to come. Human interventions are called for halting wastage and to harness the surplus water to benefit the water-stress regions. Every drop of water should be judiciously utilized to increase productivity and its reckless wastage must be eliminated. Realizing that we can't make more rains, we must have effective strategies to harvest water from the rains that we get normally. It might rescue us from hydrological anarchy. In formulating strategies for addressing the challenges on the water-related front, it is of the utmost importance to consider water as a finite ecological resource in managing which the full participation of the people of this country should be mandated. The time has come when we should not only take action against the polluters of this vital natural resource, but also consider water management under the ambit of an integrated ecological rejuvenation model where forestry and land resources also play a major part. Water harvesting and storage should also be looked into more seriously than ever before. In this context, it is imperative for us to work towards making Governmental initiatives like the various phases of the Ganga Action Plan and related Schemes successful.

Our water resources need to be conserved, recharged and managed to meet the ever-increasing demands of our farmers and industries as also our growing population, particularly the urban population. The traditional water structures using inexpensive, simple and conventional technology have indeed worked wonders in recharging the ground water of the affected regions. We can find simple solutions to our long-standing water management problems by mobilizing rural communities to go back to their old tradition of water conservation by constructing water-harvesting structures for managing their natural resources. It is essential that we make use of our grassroot-level experience in confronting this critical challenge before the nation. In this context, mobilizing the rural communities and encouraging them to make use of their traditional wisdom can be of immense help.

Prepared by Dr. P.J. Antony, Additional Director; Dr. Amar Kumar Prusty and Smt. Asha Ashok Bhairannavar, Research Officers of Lok Sabha Secretariat under the supervision of Shri P.K. Misra, Joint Secretary and Smt. Renu Sadana, Director, with inputs from the Ministry of Water Resources (MoWR) for the use of Members of Parliament in support of their parliamentary work. It is intended to serve as a background aid.